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AUTHOR Kirsch, Irwin; Guthrie, John
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ABSTRACT

Psychometric and ethnographic frameworks were used to explore the relationships among adults' uses for reading and their demonstrated competencies with related domains of tasks. Information regarding frequently occurring reading tasks was gathered from 42 adults in both work and leisure settings by means of questionnaires, interviews, and observations. Based on these data, two types of reading--text search and prose comprehension--were proposed. A two-stage information processing model for text search was developed and contrasted with a general model of reading. The subjects then undertook 38 reading tasks corresponding to prose comprehension and text search and completed measures of reading performance and reading volume. Results showed that text search and prose comprehension were uncorrelated, and that the amount of time adults spent engaged in each type of reading significantly predicted their performance in these domains. The findings support the view that people can and do acquire competencies to meet their occupational and personal reading needs. As such, the findings are consistent with other ethnographic research, which emphasizes the importance of studying reading and literacy as a system of culturally organized skills and values that are acquired in particular contexts to satisfy specific needs. (FL)

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Reading Competencies and Practices

Prose Comprehension and Text Search as a Function of Reading Volume

Irwin Kirsch and John Guthrie

August 1982

Technical Report #3

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Research Department
International Reading Association
800 Barksdale Road, PO Box 8139
Newark, Delaware 19714, USA
(302) 731-1600

Abstract

Psychometric and ethnographic frameworks as perspectives for assessing reading competencies were contrasted. Questionnaires, interviews and observations were used to obtain information regarding frequently occurring reading tasks among adults in work and leisure settings. Based on these data, two types of reading -- text search and prose comprehension -- were proposed. A two-stage information processing model for text search was developed and contrasted with a general processing model of reading. Thirty-eight reading tasks corresponding to prose comprehension and text search were administered to 42 telephone company employees. Background information, performance and reading volume measures were obtained. Correlation between performance on text search and prose comprehension was not significantly different from zero. Time spent engaged in text search accounted for 30% of the variance with text search tasks and less than 1% of the variance with prose comprehension tasks. Similarly, time spent engaged in prose comprehension accounted for over 40% of the variance with prose comprehension tasks and less than 1% of the variance with text search tasks. These findings were interpreted as indicating that: 1) there are types of reading that can be measured independently; 2) these types are distinguishable in terms of the goals and procedures of the reader; and 3) use as measured by engaged time is an important indicator of an individual's skill at performing associated tasks.

Prose Comprehension and Text Search as a Function of Reading Volume

Introduction

The purpose of this study is to examine the importance of accounting for what people do with reading as a determinant for their demonstrated proficiency with reading tasks. Evaluating the relationship between reading activities and achievements is motivated by an increased awareness of the fact that as societies grow more complex, the need for and the uses of reading are extended (Resnick and Resnick, 1977). Equally important is the belief that in order to participate fully in modern society individuals need to learn how to perform the variety of tasks resulting from the various ways in which printed information can be displayed and used. These beliefs serve to underscore our nation's commitment to a literate populace and our concern with determining how well adults read.

Scholarly discussions regarding the levels of literacy achievement among various groups in this country are based primarily on standardized reading tests and performance surveys

conducted during the last decade. Results from these measures have focused national attention on apparent widespread difficulties millions of Americans experience in dealing with printed materials needed to find and hold a job and meet other societal and personal demands. In addition, the results from these tests set the stage for future educational planning and decision making that include the current minimum competency testing movement (Pipho, 1979). Furthermore, it is not uncommon for these measures to serve as basis for curricula objectives. For example, the Adult Performance Level Survey (Northcutt, 1975) has been reportedly used in conjunction with over 100 adult basic education curricula (Sticht, 1978).

In contrast to reliance on achievement measures as the means for understanding the "reading problem" in this country, there has been a growing awareness regarding the importance of studying reading in the various contexts in which it occurs. Researchers studying literacy within an ethnographic framework demonstrated that different cultures and groups may value different kinds of literacy practices and these practices may be incongruent with those taught in schools (Heath, 1980; Szwed, 1981). Some have suggested that these activities can shape cognitive outcomes that affect domonstrated proficiency with certain tasks (Scribner and Cole, 1981). As a result, there has been a growing recognition of the need for studies of literacy that emphasize reading as it

is used by particular groups in various contexts.

Before describing the specific research undertaken, it will be useful to review the two frameworks used in addressing the "reading problem." The first, termed the "psychometric framework," focuses on major national efforts dealing with identifying and measuring reading. Questions are raised concerning the assumptions underlying this approach and its utility for future educational planning and decision making. The second, termed the "ethnographic framework," is presented and provides a conceptual framework guiding this research.

Psychometric Framework

For much of this century, standardized reading tests have served as a tool in the efficient management of human resources as well as a means by which to gauge national educational standards (Resnick, 1981). To meet these functions, test publishers have constructed measures to serve an entire population. In doing so, their tests became goal statements that were closely tied to specific societal levels. Relying on globally stated objectives and test specifications, an underlying assumption was that reading needs were the same for everyone. In this view, reading is treated as a fixed inventory of skills that can be defined and measured by means of a universal instrument, the results of which are applicable to a wide range of contexts.

Within this framework, reading is seen as a quantifiable ability that lies along a single continuum with scores indicating the various amounts of this trait an individual possesses. Determining whether or not an individual is literate involves specifiying some point along this continuum that indicates some minimally acceptable level of proficiency.

National performance surveys such as those conducted by Louis Harris and Associates (1970), Northcutt (1975), and Murphy (1973) attempted to go beyond school-related reading tasks by including a wide range of materials people are likely to come into contact with at work, at home, or while shopping or traveling. Those who support this measurement approach to reading and "functional literacy" claim that these performance surveys represent a significant improvement over traditional reading measures in that they more directly assses reading behaviors assumed important for adequate functioning in today's society.

Useful summaries of surveys falling within this framework have noted that the estimates of reading achievement vary as widely as the measures themselves (Bormuth, 1978; Fisher, 1978; Kirsch and Guthrie, 1977-1978). This variance is displayed in Table 1. Based on the critical issues these researchers raise,

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Insert Table 1 about here

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it is difficult to estimate the credibility of the literacy rates reported. It has been noted that the varying estimates of illiteracy reported within these surveys depend in part on the material selected for testing and the question asked over this material. Despite studies that have shown that as the question is varied, so are the reader's purpose and possibly the content and operations needed to complete a task successfully (Frase, 1975; 1977), none of these studies puts forth a plausible argument that the tasks it used to assess reading proficiency were required by all groups or particular groups of people, or that they were representative of the processing demands placed on people in the various contexts in which they are used. The importance of the reader's goal in accounting for performance was shown in a recent study using items from the Adult Funtional Reading Study (Murphy, 1973). Kirsch and Guthrie (1980) demonstrated that the difficulty of extracting sufficient information from a document to answer a question is a function of the interaction between the document and the question asked over it. The document itself does not account for task difficulty since a simple question can be asked over a complex document yielding an easy reading task. Conversely, a complex question could be asked over a seemingly easy document resulting in a relatively difficult task.

Rarely, however, does one find discussions regarding the

relation between the document and the question asked over it. In some cases, the skills associated with particular tasks are derived through intuitive efforts of content specialists. In other cases the skills needed to complete a task successfully are assumed to be implicit in the materials themselves. As one reading professional has stated, "One obvious advantage of discourse about skills in terms of type of material read is that it allows content-valid tests which have a great deal of intuitive appeal both to the test taker and the parties using such a test" (Tuinman, 1974, p. 68).

A critical validation issue has been raised (Kirsch and Guthrie, 1980; Hambleton, 1980). Relying on content validity issues as these surveys do for evidence to justify their utility ignores the underlying processes and attributes required to complete the tasks successfully. It is the congruence between the stated purposes of the test in terms of these processes and the description of the relationship between them and performance on associated tasks that is needed in order to gain an understanding of what a test measures. This is a construct validity issue that requires procedures and analyses that are not satisfied by studies focusing on content or predictive validity alone (Linn, 1979; Messick, 1975; 1981).

Ethnographic Framework

Since Cronbach (1975) described the need to progress beyond the two disciplines of scientific psychology and Bronfenbrenner (1976) urged the use of the concept of ecological validity by educational researchers, methods of naturalistic inquiry have received more attention and acceptance among behavioral scientists. The goal of this perspective is "to grasp the native's point of view, his relation to life, to realise his vision of the world" (Malinowski, 1922, p. 25). Applying this framework to the study of cognition, the Laboratory of Comperative Human Cognition (1979) has coined the term "ethnographic psychology." This approach, they state,

> seeks to explicate the relation between culturally organized activities and the development of systems of cognitive skills; cognitive universals may be demonstrated and socialization practices certainly control the organization of activities, but a firm understanding of what people are doing, what their activities are is the starting point of analysis (p. 164).

Within this framework, naturalistic inquiry is joined with scientific experimentation to "unpackage" complex processes required to perform particular tasks.

The importance of this perspective for reading and literacy has been demonstrated by scholars studying the influences of

cultural practice and social structure on the cognitive skills of individuals. Using historical and experimental methods, scholars (see Akinnaso, 1981, for review) have argued that since the written record is permanent it is accessible to interpretation and objective thinking. As a result, people become less governed by myth and superstition, and more persuaded by logical argument and reason (Goody and Watt, 1968). Associated with these processes are distinct properties and uses of written language that have become school-based (Olson, 1975; 1977). Generally speaking, schools, which place a heavy emphasis on these properties and uses of written language, are believed to affect the abilities of people to think logically, make inferences, and classify objects using abstract rather than concrete thought processes (Greenfield and Brunner, 1966; Greenfield, 1972; Luria, 1976). Moreover, the inference is frequently made that schooling, which connotes literacy, results in the development of general mental capacities that characterize an individual's functioning across a wide range of content domains and tasks.

In contrast to this viewpoint, Michael Cole and his associates (1971) conducting experiments among African villagers demonstrated, as did others, that schooling did increase the ability of people to perform certain cognitive processes. However, he found that under certain conditions of high familiarity and incentive, cognitive processes of non-schooled

villagers appeared to be the same as those with schooling and literacy.

From several experiments, they concluded that for schooled and non-schooled children:

> There's a different likelihood that a given situation will evoke a general as opposed to a specific mode of problem solving. It is not the case that the non-educated African is incapable of concept-based thinking, nor that he never combines sub-instances to obtain a general solution to a problem. Instead, we have to conclude that the situations in which he applies general, concept-based modes of solution are different and perhaps more restricted than the situations in which his educated mate will apply such solutions" (Cole, Gay, Glick, and Sharp, 1971, p. 225).

In other work, Scribner and Cole (1973) further discuss the importance of distinguishing between cognitive capacities and skills as a consequence of schooling and literacy. They argue that while different learning systems seem to nurture fundamental capacities, there are differences in the ways in which these capacities are integrated and called into play in various situations. Furthermore, they question the causal roles commonly attributed to literacy which are often confounded with schooling.

Among the Vai, Scribner and Cole (1978; 1981) were able to study the consequences of literacy that seem to be independent

from schooling. The Vai were famous for their invention of a syllabic writing system that is taught and learned without formal institutions and without a content that differs from other daily activities. They observed that writing was used for a restricted set of uses. These included to maintain laws, business ledgers, traditional tales, and letter writing. They found that while particular uses for literacy produced or enhanced skills closely associated with that practice, literacy was not associated with generalized abilities. In addition to demonstrating uses for literacy that lie outside of texts commonly associated with schooling, this work raises our awareness concerning the importance of cultural context and practice on the shaping of cognitive skills needed to accomplish particular activities.

Cognitive skills have also been shown to be affected within an occupational context. Studying tailors from Monrovia, Lave (1977) constructed tasks using arithmetic operations associated with varying domains of activities. One set of tasks involved examples of problems involving arithmetic that were taken from tailors' everyday work. Other tasks involving the same operations were taken from other domains such as schooling, carpentry and finance. Lave reports that if the tasks were those that tailors engaged in, years of tailoring was the best predictor of performance. If tasks were ones encountered in school, then years of education was the best predictor. Neither

of these variables predicted performance on dissimilar tasks not closely analogued to either domain even though they were thought to involve the same underlying operations.

A need exists for an examination of reading and literacy in terms of its sources in occupational, cultural, and personal contexts (Havelock, 1980; Resnick and Resnick, 1977; Szwed, 1981). Heath (1980) reported that the uses of reading among working class communities could be described in terms of: instrumental; social interactional; news-related; memory-supportive; substitutes for oral messages; provision of a permanent record, and personal confirmation. In addition to demonstrating that different communities and individuals can be characterized by particular uses for reading, Heath also demonstrated that the dominant uses of reading for some individuals or communities may be incongruent with those stressed in schools.

Two broad classes of reading tasks have also been distinguished among military personnel (Sticht, 1978) and more recently extended to civilian jobs (Diehl, 1980; Mikulecky and Diehl, 1980). One, termed "reading to learn," involves reading to acquire new information which frequently is integrated into the existing knowledge base of the reader and learned for recall in some form at a later date. A second type of task, which seems to characterize the work environment, is termed "reading to do."

These tasks involve using written materials to look up information for a particular purpose which can then be forgotten.

One question of interest to Sticht was whether these two types of tasks were associated with different reading behaviors. In studying this question, 180 Navy personnel in three roles (student, instructor, and job incumbent) were asked to cite one example of each type of reading task that they engaged in. Sticht reports that no specific strategy could be recalled by persons engaged in reading to do tasks even when some incidental learning was reported to have occurred. On the other hand, elaborate strategies were reported for 76% of the reading to learn tasks. These include: read/rehearse; relate/associate; problem solve/question; and focus attention. Accordingly, the utility of a particular material for an individual is likely to affect the strategy he or she employs. Unfortunately, neither Sticht nor Mikulecky and Diehl pursued investigations into processing differences between these proposed types of tasks.

Research Goals

It was the purpose of this investigation to explore the relationship among people's uses for reading and their demonstrated competencies with related domains of tasks. Use referred to a directed goal for reading that was often associated with a familiarity that may be brought about through repeated

behavior or practice. It was expected that the specific uses people have for reading can be associated with particular processes that through frequent engagement can result in a skill to perform groups of tasks that are not generalizable across context or use. Competence was defined in this study as having the skill to perform a class of tasks that may be distinguishable in terms of a processing model and independent performance.

To explore the relationship between competencies and uses for reading, several objectives were pursued. These were to: 1) determine the amounts and frequency of reading performed by a sample of adults working in several occupational categories; 2) describe these activities in terms of the materials themselves and the uses to which they are put; 3) develop sets of tasks that reflect the interaction between use and material; 4) describe the relationship between performance on these domains of tasks; and 5) evaluate the relationship between reading volume and performances on these two domains of tasks.

Method

Organization

Initial contact was made with persons of high authority (Dean, Eichorn, and Dean, 1969) in several large organizations within commuting distance that were thought to have a wide of range jobs and people. Companies, including ICI, the Americas

and the Chesapeake and Potomac Telephone Company expressed an initial interest in this study. Negotiations that involved describing the research project, the types of information to be gained, and the role of the organization were undertaken. After a series of letters and meetings, access was granted to study persons within the C&P telephone company. Several supervisors granted permission for their workers to participate on company time in the study. Employees were notified about the study through their supervisors who provided an initial description of the study to them. All persons participated on a volunteer basis.

Sample

Forty-two employees of the Chesapeake and Potomac Telephone Company who occupied positions classified as either service or clerical volunteered to participate in this study. These included 26 service representatives, 13 directory compilation clerks, 2 service order writers, and 1 service order typist. Although not a random sample, these employees were of interest in this study because: 1) reading was an important part of their jobs; 2) their job titles represent about one-third of the non-management positions within the company, and 3) persons occupying these positions had a broad range of educational backgrounds, age, and job experience. For example, 25 people in this sample had at least some college experience, while 17 had

not advanced beyond the high school level.

Preliminary Observation

Through a series of questionnaires, interviews, and observations it was determined that a significant portion of job reading activities involved using reference materials to locate specific information to satisfy an immediate need. Primary among these reference materials was the service representative's handbook. This is an encyclopedia-type volume containing 500 or more pages that are separated into eight sections with the first being a detailed index. Each service representative has this reference on his or her desk and is instructed to use it with each customer contact. While being a primary reference source for the service representative, this material is also known to other company employees although they use it infrequently, if ever.

A series of interviews were conducted with the training supervisor and an on-the-job supervisor to determine how this handbook was used in the day-to-day activities. By asking what information was sought in particular situations, what sections were attended to, how individuals knew where to look, and how they know when to stop reading, an information processing model was generated. In constructing the model it was assumed that the reader has a specific goal which takes the form of information to

be located and abstracted. The information required to satisfy the goal is located in a particular section of the text that is embedded in a larger collection of material.

Two Modes of Reading

The model has two stages. First, the reader must define the information needs and locate the section in the manual which contains the critical information. This involves using a detailed index. The operations assumed to underlie this made up Stage 1 of the model. Next, the reader must find the information within the identified section or page that is to be extracted and do so. Stage 2 of the model contains operations assumed needed to accomplish this.

This model, displayed in Figure 1, depicts a type of reading

Insert Figure 1 about here

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that involves a selective search to identify the specific information that frequently involves rapid scanning strategies to match informational needs to text structure. Activities associated with these search behaviors are not unlike those described in general models of problem solving in which successful performance entails setting goals, selecting actions, and interpreting information from a display (Simon, 1979). This

proposed type of reading will be referred to as "text search" and contrasted with general processing models that have been proposed to account for reading.

As Danks and Fears (1979) noted, a common processing model of reading that is commonly assumed "proposes that print is first divided into a phonological code that has most of the characteristics of a verbal/aural input. This code is then comprehended by the usual routines of language comprehension that the child has developed for speech" (p. 89). This view of reading is in line with that of Goodman (1976) and Smith (1971) who states that reading is an aspect of language only superficially different from the comprehension of speech. It is also consistent with Sticht's (1978) developmental model of literacy.

The model of reading assumed by these researchers focuses on prose materials that are of meaningful paragraph length typical of that found in novels, history texts, and other everyday communication. Reading of connected discourse, for example, is frequently associated with a general goal like "learn the important points" that is often determined during the course of reading and is based largely on the content of the passage rather than some informational demand external to it. Persons engaged in reading connected discourse generally are assumed to read in a left-to-right fashion, exhaustively. This involves careful

processing of large amounts of information that requires integration of sentences and paragrpahs into a coherent whole (Kintsch, 1979). The proposed competency associated with successful performance on tasks consisting of this type of document and use will be referred to as prose comprehension in this study.

Constructing Prose Comprehension and Text Search Tasks

The set of tasks corresponding to prose comprehension involved assembling items from existing reading exercises that were thought to incorporate different skills relating to reading comprehension commonly associatied with school learning.

Exercises from NAEP's 1970-1971 Reading Assessment Survey and from the Nelson-Denny Reading Test were reviewed. All exercises consisted of one or more paragraphs of connected prose followed by one or more multiple choice questions. Exercises selected from NAEP were among those administered to 17 year olds and adults. Seven reading passages with 20 questions were eventually selected. Five of these came from NAEP and had 12 items. The remaining two were from the Nelson-Denny tests and had 8 items.

These passages were chosen for several reasons. First, they covered a wide range of content areas. Second, for NAEP items, item difficulties and administration time derived from national samples were available. Third, the exercises covered such skill

areas as understanding words in context, reading for the main idea, reading for significant facts, and drawing inferences. Collectively these tasks were assumed to reflect what experts define as prose comprehension.

The domain of tasks corresponding to text search reading was somewhat more difficult. As already discussed, the text search model developed around the service representatives' handbook served as the basis for developing tasks. Exercises were constructed that were representative of tasks found in this manual. Through discussions with the training supervisor, tasks were selected that in her opinion would be less familiar to most service representatives. This criterion was applied to help ensure that they would not be able to complete the tasks using memory only. They would need to refer to the text for answers.

To balance these tasks and to assess the generalizability of the domain, an additional set of tasks believed to involve similar processing demands was constructed using other reference manuals that were unfamiliar to this sample of people. These included: a postal service manual used in an office mailroom; a world almanac, and a ground transportation manual which contained car rental agencies and rates.

A total of 11 text search tasks were constructed that involved the actual use of reference materials. Permission was eventually granted to use the service representatives' manual

during testing. In addition to extracting the correct information from a particular page in the manual, persons had to use the manual to locate the page containing the correct information as part of the tasks. Five items were taken from the service representatives' manual, four were taken from the postal service manual, and one each from the almanac and the transportation reference.

Procedures

Testing was completed on an individual basis since actual text reading materials were used, and only one set was available. Pilot data were collected on 10 people having similar educational and occupational backgrounds. The primary focus was to ensure that individual exercises were neither too easy nor too difficult and to judge more accurately how much time should be provided for text search tasks.

A total of 30 minutes was allotted for the set of prose comprehension tasks. This was derived from pilot data as well as NAEP administration times. The text search task had a 4-minute limit on each of the 11 items. If after 4 minutes the individual was unable to locate the page containing the needed information or exhibited high frustration with the task, or went to the incorrect page and continued no further, he or she was stopped and shown the page with the target information. He or she was

then given the opportunity to answer the question. Text search and prose comprehension tasks were counterbalanced so that half of the subjects received each domain first.

After completing all assessment exercises, individuals were asked to participate in an activities survey. This took an additional 30 minutes. Overall, each person participating in the study spent anywhere from an hour and a half to two hours completing both the assessment and interview phases of the study.

Uses of reading were quantified in terms of volume and reading activities. Volume of reading associated with each domain of task was estimated through the structured interviews occurring after the assessment phase. All participants were asked to estimate the amount of time they spent reading particular content in newspapers, magazines, books, and certain brief documents. They were also asked to judge whether this reading was similar to one or the other set of performance tasks. Based on their responses, estimates were obtained for each person regarding the amount of time spent reading each day corresponding to text search and prose comprehension. In addition, each person provided information regarding their age, education, and job experience. Thus, for each person there was a set of background performance and reading volume measures.

Results

Volume of Reading

On average this group of telephone employees was over 30 years of age and had some college experience. They had been working at their present jobs almost six years and spent approximately 2 1/2 hours each day using reference materials to locate and abstract requested information and approximately 1 1/2 hours each day reading prose materials to acquire information. They tended also to be proficient readers, averaging slightly better than the national sample on prose comprehension tasks, and 84% with text search tasks. Descriptive statistics pertaining to this set of variables are provided in Table 2.

Insert Table 2 about here

Perhaps more interesting about these data is the variability observed among this sample in education, job experience, competence, and volume of reading. Persons ranged in age from 22 to 58 years with anywhere from 1 to 18 years of experience working at their present jobs. Twenty-five persons had at least some college experience with one person doing graduate work; 17 had not advanced beyond the high school level. Scores on the performance measures ranged from 10-80% correct on prose comprehension tasks, and 36-100% on text search tasks. Also

notable was the variation in the volume of reading engaged in. Persons reported reading anywhere from several minutes to many hours each day both at work and during leisure hours.

Reliability

Since testing was conducted on a one-to-one basis and took approximately two hours, no retesting was possible. Reliability of the performance variables was, therefore, limited to an estimate of internal consistency using alpha coefficient. Alpha was calculated for the set of prose reading and for the set of text search tasks using the SPSS reliability program.

Prose reading tasks consisted of 20 multiple choice items asked over seven passages. Alpha was estimated to be .72 indicating that this set of items was measuring much of the same thing. However, this estimate is somewhat lower than what is usually sought and reflects the fact that several reading skills (for example, literal and inferential) were being measured by a relatively small number of items. It was estimated that doubling the length of the test would increase alpha to .84. Similarly, for text search tasks, alpha was calculated to be .72. This estimate was based on the combined number of stage one and stage two items. There was a total of 11 tasks with a possible score of 28. Again, doubling the length of the test was estimated to increase reliability significantly.

Judging the reliability of reading volume was based more on subjective criteria. Care was taken to ensure that interviewees understood the nature of each question being asked them. Interviewer knowledge of the various jobs provided a context in which to probe responses that seemed unclear or ambiguous. This served to ensure that questions were being answered comprehensively.

Certain questions, such as age, occupation, material read, and place where a particular reading activity most frequently occurred, were easy to ask and respondents seemed to have no trouble answering. The overwhelming majority of persons took an interest in talking about their reading habits and were attentive and thoughtful in responding.

Most persons commented that they hadn't thought about reading in terms of volume, but felt that they could accurately judge "on average" the time they spend with newspapers or reading a book or magazine. They felt it was somewhat harder to estimate job reading because it so frequently occurs as part of a larger task. For example, service representatives noted that they would be reading a customer's file on a computer screen while simultaneously talking with the customer, writing up an order and looking up information in their handbooks.

Although it was recognized that individual estimates regarding specific amounts of time with particular materials

contained some degree of error, it was felt that the responses provided were useful indices of relative standing with respect to individual reading habits.

From a more objective perspective, there were 22 people who participated in the testing and interview phase of the study who had also completed an initial reading activity survey. Although the survey was different in nature and scope from the interview, it was possible to get an estimate of total time spent reading each day from each person. It should also be mentioned that almost nine months had elapsed between the initial survey and the interview. Depsite these factors, total time spent reading estimated from these two measures correlated .67. This was taken as further indication that persons were not randomly responding to questions but were providing honest estimates regarding their reading activities.

Relationship among Competency Measures

Independence of prose comprehension and text search tasks. A major finding of this investigation was that the two domains of tasks were uncorrelated. Table 3 shows that performance on prose comprehension and text search correlated at .26, which was not significantly different from zero. Also displayed in this Table is the fact that age, education, and job experience were not associated with performance or reading volume.

Insert Table 3 about here

The lack of association between prose reading and text search tasks was taken as an indication that these domains of tasks were measuring different skills in this sample. As Carroll (1981) has noted, when performance on two reliable measures is uncorrelated, this is an indication that the underlying processes are likely to be different, whereas one does not know what to conclude about underlying processes when two variables show significant correlations. Certainly, these two types of reading share some of the same processes including decoding and vocabulary. However, as indicated by this lack of association they also differ in important ways that have measurement as well as educational implications. It should be mentioned that the observed lack of association between prose comprehension and text search tasks in this sample was in contrast to findings reported by Sticht (1975) and Mikulecky and Diehl (1980) who explored relationships between general reading and job reading tasks. These issues will be addressed in the final section of this paper.

One factor pertaining to the observed correlation between prose comprehension and text search tasks that needs to be addressed here is the possible attenuation that resulted from the errors of measurement associated with each domain of task. The

presence of measurement error or unreliability will cause a loss of efficiency in estimating each domain and therefore the measured association between them. Applying a correction for attenuation formula, it was estimated that the correlation between prose comprehension and text search was reduced from an estimated .36 to .26, or that the presence of measurement error resulted in a 6% loss of predictive capacity from 13% to 7%. Thus, the conclusion is drawn that measurement error had a negligible part to play in the observed association between these two domains of task. Rather, it is accountable more in terms of the skills needed to accomplish each set of tasks.

Use as an important indicator of competence. While proficiencies across the two domains of tasks were uncorrelated, time spent reading for either text search or prose comprehension was significantly related to demonstrated efficiency to perform associated tasks. As Table 3 reveals, time spent in reading that was similar to text search tasks was correlated with performance on text search tasks (r = .55), while it was uncorrelated with competence in performing prose reading tasks (r = .01). Similarly, time spent reading prose comprehension predicted performance with prose reading tasks (r =.64), while being uncorrelated with text search tasks (r = .08). In addition, time spent engaged in prose comprehension was not associated with time spent text search tasks (r = .12).

The utility of use is estimated by time spent reading for a particular outcome and predicting competence with an associated set of tasks can be seen within a regression framework. Table 4 shows summaries from two regression analyses in which performance on prose reading and text search tasks were dependent measures.

Insert Table 4 about here

The "F" values opposite each beta indicate the incremental contribution of each variable by assuming it was added last to the equation and corresponds to Darlington's (1968) view of importance. As displayed here, the only significant "F" in each regression was for the variable indicating the amount of time spent reading that was associated with a given domain of tasks. Time spent reading prose materials for information was the most important variable in predicting proficiency with prose comprehension tasks. Similarly, time spent reading for outcomes similar to text search tasks was the most useful variable in predicting performance with text search tasks.

Another way in which to view this relationship is with partial correlations. Table 5 shows the relationship between use and competence for each type of reading controlling for other predictors. Individually and collectively these variables do not

Insert Table 5 about here

significantly reduce the association between use and proficiency for a particular set of tasks. These results suggest that this relationship accounts for a set of variance that is not shared with and not accountable for in terms of these other predictors.

It would appear from these analyses that people can and do develop independent sets of competencies that relate to particular uses they have for reading. The skills needed to perform prose comprehension tasks do not appear to be the same as those needed to perform text search tasks. Further, time spent engaged in reading for a particular use is more powerful in predicting performance than any other performance or background variable measured in this study. In addition, one type of reading did not substitute for the other type. Prose and text search reading for this sample were distinct from each other both in terms of time spent engaged in each type of reading and in terms of demonstrated competency in performing respective tasks.

Reading Activities

This group of telephone employees was a group of readers who on average spent over six hours each day engaged in various job reading tasks and almost two hours each day reading for their

personal enjoyment and benefit. While there is considerable variability in the amount of time these individuals estimate they spend reading, 100% reported reading something as a part of their jobs as well as at home during leisure time. Table 6 gives a breakdown of the percentage of readers and the average minutes per day spent reading from various media for different uses at work and during leisure time.

Insert Table 6 about here

Leisure reading consisted primarily of the type of reading defined in this study as prose comprehension. Of the persons studied, 80% reported reading for this use from newspapers, magazines, and books. Book reading had the highest volume for this sample with the average person spending almost one hour each day reading from this medium. Other uses for reading during leisure activities involved much smaller percentages of people and was engaged in for shorter periods of time. For example, 45% of the sample reported using books for text search tasks for an average of 4.5 minutes per day. This involved references such as home maintenance, auto repair, and cooking. Approximately 15% of leisure reading involved uses that were not classified and examined in this study. This reading includes skimming through the newspaper, reading classified ads, as well as reading comics

and TV listings.

Job reading, in contrast, involves primarily text search and other instrumental uses for reading. Less than 5% of job reading was reported as involving prose comprehension. Ninety-eight per cent of the sample reported spending over two hours each day engaged in text search tasks. Another 4 hours was reportedly spent each day reading customer files and records in both hard copy and from a computer terminal. Interestingly, for this sample book reading and work was limited to text search. Prose comprehension was engaged in for brief periods and involved reading memos or brief reports dealing with job related issues. However, not everyone read these materials since it was the supervisor's responsibility to ensure that persons understood the contents of this material.

These findings are consistent with those reported by Mikulecky (1982). He found that groups of professionals, middle-level, and blue collar workers each spend more than 60% of their reading time at work engaged in instrumental or "reading-to-do" tasks.

Discussion

The findings that text search and prose comprehension were uncorrelated and that the amount of time people spend engaged in each type of reading significantly predicts their performance in

these respective domains of tasks supports the view that people can and do acquire competencies to meet their occupational and personal reading needs. As such, they are consistent with research cited under the "ethnographic framework" which emphasizes the importance of studying reading and literacy as a system of culturally organized skills and values that are acquired in particular contexts to satisfy specific needs. Within this orientation it is recognized that successful performance requires applying a range of basic processes to materials varying in content and format. The origin and consequences of these processes are seen as being accountable partly in terms of the processes themselves and partly in terms of the occupational and social contexts in which they occur.

It has been argued that it is the interaction between use and material that operationally defines a reading task and determines the processing demands required for successful performance (Kirsch and Guthrie, 1980). Understanding the nature of these processes and how they may be altered as a result of various materials and uses people have for reading provides a context for developing construct valid tests. Accordingly, without such an understanding, tests run the risk of being merely sampling devices rather than accurate measures of underlying construct(s) that are inferred to account for performance (Messick, 1975).

Studies that report moderate correlations among reading tasks

on subtests are frequently interpreted to indicate that reading comprehension is a general ability or unitary trait. Thorndike (1973-1974) in reviewing research on the nature of the reading process stated that "performance on a wide variety of reading tasks calls primarily for some one common ability; that this ability can be distinguished only with difficulty from that represented in general measures of verbal intelligence or scholastic aptitude, and may be thought of as verbal reasoning" (p.146). Others have similarly noted the lack of statistically identifiable comprehension skills (MacGinitie, 1973; Pearson and Johnson, 1968; Rosenshine, 1981) noting that perhaps the most promising distinction is between literal and inferential comprehension. MacGinitie (1973) cautions: "Even this distinction is not any easy one, and we should require a clear demonstration that two subtests are measuring this distinction before we pay much attention to comprehension subtest scores that claim to represent different aspects of comprehension" (p. 41).

Relying solely on statistical procedures to identify reading skills is questionable due to the complex relationships among variables. Carroll (1981) has stated that when performance on two variables is correlated, this does not necessarily imply psychological similarity. Alternative explanations might be plausible in accounting for these findings. In reviewing research on the relationship between vocabulary knowledge and

reading comprehension, Anderson and Freebody (1981) examined three alternative explanations having different educational implications that either singularly or in combination may account for the association between these constructs. They conclude that a necessary first step in improving our understanding of this relationship is improved methods of assessing vocabulary knowledge. They caution, however, that producing "a single value from performance on a sample to represent total vocabulary size may be an exercise that relies too heavily on the assumptions of a static population of isolated words and on an overly restrictive view of how we generate and use words in context" (p. 110). Similarly, in assessing reading comprehension, producing a single value from performance on a sample of tasks may yield an overly restrictive view of how individuals acquire and use reading in particular contexts.

Relatively high observed correlations among reading subtests or tasks may be accountable in terms of the reading activities of the examinees. Persons who are considered mature readers may read a wide range of materials for a variety of uses resulting in various competencies that are not distinguishable by a performance measure alone. Applying criteria from their reading maturity scale, Gray and Rogers (1956) described eight characteristics of the most mature reader. In addition to having high enthusiasm and high reading volume, their synthetic "mature

reader" would read in at least 13 different interest areas, while pursuing at least one in great depth; would engage in reading for nine purposes and would be cognizant of the ways in which reading might serve and promote individual growth. Therefore, persons who score well on a wide range of reading tasks that are conceptually distinguishable may have "mature" reading characteristics. Conversely, a lower set of intercorrelations among reading subtests or tasks may be found among individuals who have highly concentrated reading activities. Although their total volume may be relatively high, their restricted uses for reading may result in a limited capacity to perform some types of reading tasks but high proficiency with other tasks.

Sticht (1982) has reported recent evidence that indicates that persons can acquire or enhance their capacity to perform a particular type of reading as opposed to what he terms "general" reading. He found that marginally literate adults enrolled in a job-related reading program made about twice the gain in performance on job-related reading tasks than with tasks typically found on standardized reading tests. Hence, people who engage in a particular type of reading are able to develop their skills in performing associated tasks that are not generalizable across a wide range of contexts and materials.

The point here is that the most valid tests and, therefore, those having the most useful implications for assisting

individuals in meeting their reading demands are likely to be those that are well grounded conceptually and related to an individual's cultural, familial, or occupational contexts for reading. Additional research is required to explicate further the range of uses people have for reading and how these relate to demonstrated proficiency with associated tasks.

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TABLE 1

CRITERIA AND STANDARDS USED TO EVALUATE LEVELS OF LITERACY

SOURCE	CRITERIA	"% ILLITERATE"
CENSUS, 1969	SELF-REPORT	1.0%
NATIONAL HEALTH SURVEY (1973)	READING GRADE LEVEL (4.0 RGL AMONG NON-INSTIT. 12-17 YEARS OLD)	4.8%
HUNTER AND HARMAN (1978)	EDUCATIONAL ATTAINMENT (PERSONS 16 YEARS OF AGE AND OLDER, NOT IN SCHOOL OR HAVE NOT GRADUATED FROM HIGH SCHOOL)	38.0%
SURVIVAL LITERACY STUDY (1970)	"REAL LIFE TASKS" (PERSON 16 AND OLDER AVG. 30% INCORRECT RESPONSES)	4.8%
ADULT PERFORMANCE LEVEL (1975)	"REAL LIFE TASKS" (PERSON 16 AND LODER JUDGED TO BE INCOMPETENT OR FUNCTIONING WITH DIFFICULTY)	53.0%
NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS, 1975	"REAL LIFE TASK" (17 YEAR OLDS IN HIGH SCHOOL ANSWERING LESS THAN 75% CORRECT)	13.0%

Figure 1

A Processing Model for Text Search

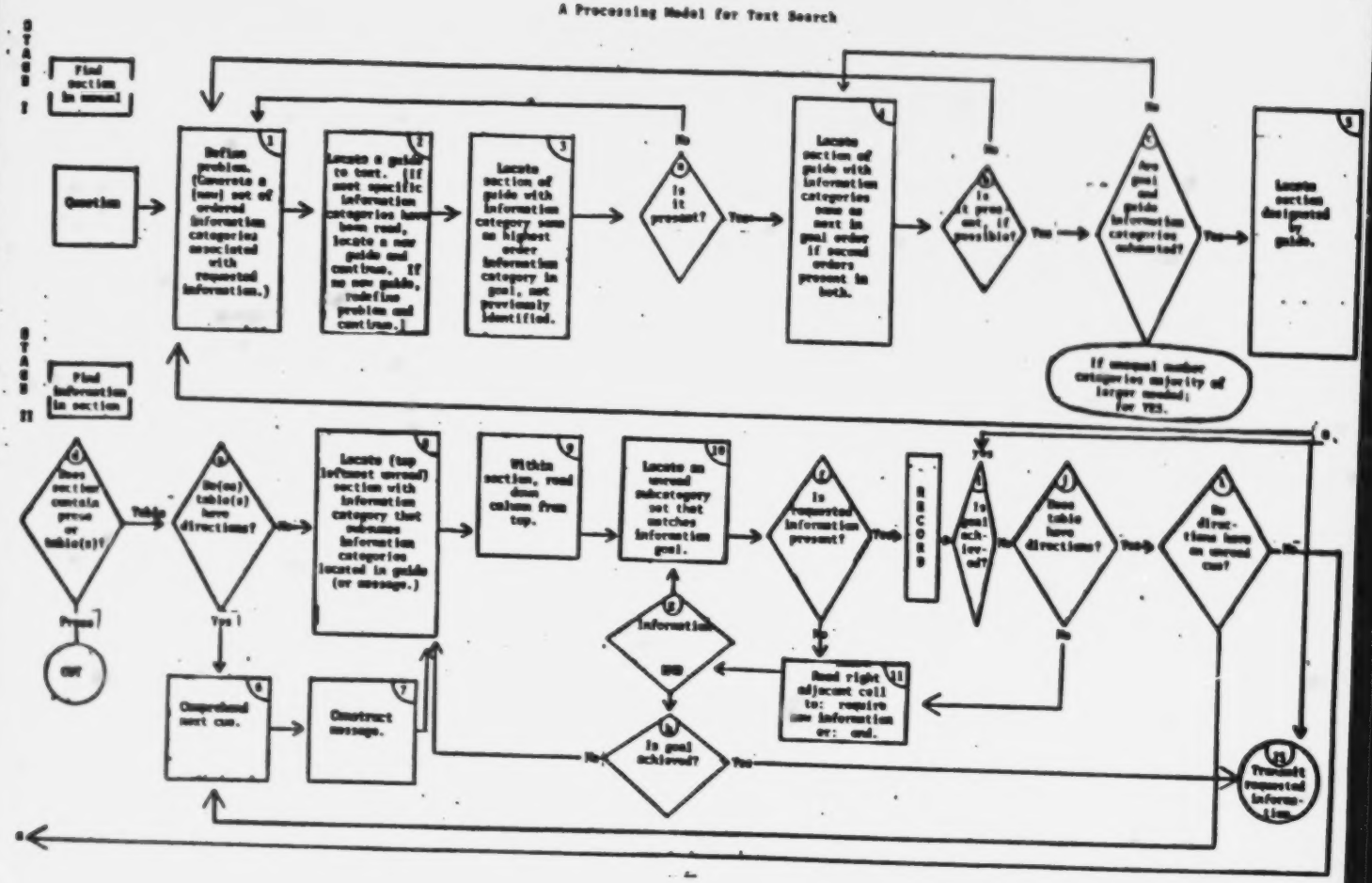

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TABLE 2

MEANS, STANDARD DEVIATIONS AND NUMBER SAMPLED ON SELECTED BACKGROUND, PERFORMANCE, AND READING VOLUME

		$\bar{X}$	S.D	N
BACKGROUND	AGE	32.8	8.9	42
	EDUCATION	13.3	1.6	42
	JOB EXPERIENCE	5.8	4.4	41
PERFORMANCE	PROSE READING	11.2	3.6	42
	TEXT SEARCH	23.8	3.2	42
VOLUME	MIN./DAY PROSE	99.5	69.6	42
	MIN./DAY TEXT SEARCH	144.8	142.7	42

TABLE 3

RELATIONSHIPS AMONG LITERACY MEASURES

		1	2	3	4	5	6
1	EDUCATION	-					
2	JOB EXPERIENCE	.25	-				
3	PROSE COMPREHENSION	.17	-.08	-			
4	TEXT SEARCH	.23	-.11	.26	-		
5	MIN./DAY PROSE	.21	-.22	.64*	.08	-	
6	MIN./DAY TEXT SRCH	.04	.01	.01	.55*	.12	-

* $P \leq .01$

$N = 42$

Table 4

Summary of Multiple Regressions with All Predictors in the Equation

Dependent Variable: Text Search(# Corr.)			Dependent Variable: Prose Reading(# Corr.)		
	Beta	F		Beta	F
Age	.12659	.633	Age	-.07938	.269
Education	.19699	1.915	Education	-.02184	.024
Job Experience	-.12029	.610	Job Experience	.12198	.685
Prose Reading	.28304	2.696	Text Search	.25955	2.696
Min/Day Prose	-.10502	.331	Min/Day Text Search	-.07112	.202
Min/Day Text Search	.55285	16.479*	Min/Day Prose	.64605	22.499*

* $P \leq .01$

TABLE 5

PARTIAL CORRELATIONS BETWEEN USE AND COMPETENCE

MIN./DAY TEXT SEARCH WITH TEXT SEARCH CONTROLLING FOR		MIN./DAY PROSE WITH PROSE COMPREHENSION CONTROLLING FOR	
1 EDUCATION	.52*	1 EDUCATION	.63*
2 JOB EXPERIENCE	.52*	2 JOB EXPERIENCE	.64*
3 PROSE READING	.55*	3 TEXT SEARCH	.62*
4 MIN./DAY PROSE	.55*	4 MIN.DAY TEXT SEARCH	.62*
1,2,3, AND 4	.55*	1,2,3, AND 4	.59*

$P \leq .01$

$N = 42$

TABLE 6

PERCENTAGE OF READERS AND AVERAGE MINUTES PER DAY SPENT READING NEWSPAPERS, MAGAZINES, BOOKS, AND BRIEF DOCUMENTS FOR DIFFERENT USES IN WORK AND LEISURE ENVIRONMENTS

	LEISURE						WORK					
	PROSE COMP.		TEXT SEARCH		OTHER		PROSE COMP.		TEXT SEARCH		OTHER	
	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$
NEWSPAPERS	83	17.7			69	10.9						
MAGAZINES	79	18.9	29	5.6	21	3.1	43	8.4			2	3.7
BOOKS	79	47.8	46	4.5	21	4.7			98	133.9		
BRIEF DOCUMENTS (OUTLINES, MEMOS, FILES, RECORDS)							77	7.0			30	228.1

READING COMPETENCIES AND PRACTICES

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